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10/535,104

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EXAMINER

ROBERTS, MICHAEL P

ART UNIT

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2873

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------|----------------------------------|--|
| Office Action Summary | Application No. 10/535,104 | Applicant(s) HECKMEIER ET AL. | |
| | Examiner Michael P. Roberts | Art Unit 2873 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-10, 13-18, 21, 23 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-10, 13-18, 21, 23 and 27-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>20070416</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of the subject matter of cancelled **claim 5** (now found in currently amended independent **claim 1**) is withdrawn in view of the reference(s) to Saupe '770 (US 5,368,770) in view of Greenfield '107 (US 6,421,107). Rejections based on the cited reference(s) follow.

Election/Restrictions

2. Applicant's arguments, see Remarks, filed 4/16/2007, concerning the restriction requirement have been fully considered and are persuasive. The restriction requirement is deemed improper and therefore withdrawn. Accordingly, group II (presently **claims 23, 27-29**, and now including newly added **claim 32**) has been rejoined with the elected invention (presently **claims 1-4, 6-10, 13-18, 21**, and now including newly added **claims 30 and 31**). A complete action on the merits of all claims follows below.

Examiner's Comment

3. For applicant's information, newly added **claims 30-32**, and the newly added limitations in the previously presented claims, were reviewed for prohibited new matter and support was found within the specification, drawings, and claims for the new limitations within these claims.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on 4/16/2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

5. **Claim 4** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. **Claim 4** repeats the limitations of **claim 1**, lines 10-11, and thus does not further limit the subject matter of independent **claim 1** from which it depends.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 1, 28, 29, and 32** (and therefore dependent **claims 2-4, 6-10, 13-18, 21, and 30-31**) are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the mesogenic modulation medium" in lines 10, 13, 15, and 17. There is insufficient antecedent basis for this limitation in the claim since only "a modulation medium" was previously recited. For purposes of examination the examiner

interprets line 6 of the claim as if it recited, “a mesogenic modulation medium,” thus providing proper antecedent basis for the rest of the claim.

Claim 28 is indefinite since the phrase, “range of 5 degrees or more than 5 degrees” is not clear because it is not clear whether the intended limitation should be a “range of more than 5 degrees” or an assigned temperature of “5 degrees”. For purposes of examination the examiner interprets the claim to read, “range of more than 5 degrees”.

Claim 29 is indefinite since the phrase, “range of 10 degrees or more than 10 degrees” is not clear because it is not clear whether the intended limitation should be a “range of more than 10 degrees” or an assigned temperature of “10 degrees”. For purposes of examination the examiner interprets the claim to read, “range of more than 10 degrees”.

Claim 32 is indefinite since it claims all temperatures possible: the claim is directed to temperatures below 0 degrees, between 0 and 80 degrees, and above 80 degrees. Thus it is unclear which temperature range applicant intends to claim, if any. For purposes of examination the examiner interprets the claimed range to be above 80 degrees Celsius.

Claims 2-4, 6-10, 13-18, 21, and 30-31 are rejected under 35 U.S.C. 112, second paragraph because they inherit the indefiniteness of the claims from which they depend.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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9. **Claim 23, 27, 28, 29, and 32** are rejected under 35 U.S.C. 102(b) as being anticipated by Greenfield '107 (US 6,421,107).

Regarding **claim 23**, Greenfield '107 discloses a mesogenic modulation medium which comprises: a chiral component, component A, which consists of one or more chiral compounds at least one of which has an HTP of $30 \mu\text{m}^{-1}$ or more, and optionally an achiral component, component B, which consists of one or more achiral compounds (claim 6; col. 3, lines 32-43).

Regarding **claim 27**, Greenfield '107 discloses a mesogenic modulation medium as shown above, and further discloses the medium having a characteristic temperature in the range from 0-60 degrees Celsius (col. 6, lines 56-59).

Regarding **claim 32**, Greenfield '107 discloses a medium as shown above, and further discloses the medium having a blue phase in the range above 80 degrees Celsius (col. 26, lines 17).

Regarding **claim 28**, Greenfield '107 discloses a medium as shown above, and further discloses the medium having a blue phase in the range of more than 5 degrees (col. 26, lines 17).

Regarding **claim 29**, Greenfield '107 discloses a medium as shown above, and further discloses the medium having a blue phase in the range of more than 10 degrees (col. 26, lines 17).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. **Claims 1-4, 9, 15, 17, 30, and 31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Saupe '770 (US 5,368,770) in view of Greenfield '107 (US 6,421,107).

Regarding **claim 1**, Saupe '770 discloses an electro-optical light modulation element (col. 1, lines 6-11) comprising: a substrate or a plurality of substrates (col. 2, lines 26-48; abstract); an electrode arrangement (col. 1, lines 6-11, 39-52); a mesogenic modulation medium, wherein the light modulation element is operated at the temperature at which the modulation medium in the unaddressed state is in an optically isotropic phase (col. 2, lines 26-49) and; the mesogenic modulation medium comprises a chiral component, component A, which consists of one or more

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chiral compounds (col. 3, lines 37-55); and the mesogenic modulation medium is operated at the temperature at which the light modulation element has a blue phase or the mesogenic modulation medium is operated at the temperature at which the light modulation element is in the isotropic phase (col. 2, lines 26-49; col. 4, lines 45-61), but does not specifically disclose an element or plurality of elements for polarization of the light, wherein at least one of the chiral compounds has an HTP of $30 \mu\text{m}^{-1}$ or more, and wherein the mesogenic modulation medium comprises an achiral component, component B, which consists of one or more achiral components. In the same field of endeavor of light modulating elements, Greenfield '107 teaches of an element or plurality of elements for polarization of the light (abstract; col. 1, lines 4-11), wherein at least one of the chiral compounds has an HTP of $30 \mu\text{m}^{-1}$ or more (claim 6), and wherein the mesogenic modulation medium comprises an achiral component, component B, which consists of one or more achiral components (col. 3, lines 32-43), for the purpose of inducing the liquid crystalline phase behavior in the mixture, and for providing a multilayer film for use in optical elements that allows better control of the reflection wavelength and is suitable for mass production (col. 2, lines 9-14; col. 3, lines 32-43). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the light modulation element of Saupe '770 to include an element or plurality of elements for polarization of the light, wherein at least one of the chiral compounds has an HTP of $30 \mu\text{m}^{-1}$ or more, and wherein the mesogenic modulation medium comprises an achiral component, component B, which consists of one or more achiral components, since Greenfield '107 teaches of an element or plurality of elements for polarization of the light, wherein at least one of the chiral compounds has an HTP of $30 \mu\text{m}^{-1}$ or more, and wherein the mesogenic modulation medium comprises an achiral component,

component B, which consists of one or more achiral components, for the purpose of inducing the liquid crystalline phase behavior in the mixture, and for providing a multilayer film for use in optical elements that allows better control of the reflection wavelength and is suitable for mass production.

Regarding **claim 2**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Saupe '770 further discloses that the electrode arrangement is able to generate an electric field having a significant component parallel to the surface of the mesogenic modulation medium (col. 1, lines 39-52)

Regarding **claim 3**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Greenfield '107 further teaches that the mesogenic modulation medium has a blue phase (col. 22, lines 52-53).

Regarding **claim 4**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Greenfield '107 further teaches that the mesogenic modulation medium comprises a chiral component, component A, which consists of one or more chiral compounds (col. 3, lines 37-40).

Regarding **claim 9**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Greenfield '107 further teaches that the mesogenic modulation medium comprises a chiral component, component A, which consists of two or more chiral compounds (col. 3, lines 37-40).

Regarding **claim 15**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Saupe '770 further discloses an electro-optical display containing one or more such light modulation elements (abstract; col. 1, lines 6-52).

Regarding **claim 17**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Saupe '770 further discloses an electro-optical display system containing one or more such electro-optical displays (col. 1, line 55-col. 2, line 25; col. 3, lines 3-21).

Regarding **claim 30**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Greenfield '107 further teaches that the component A which consists of one or more chiral compounds at least one of which has an HTP of $50 \mu\text{m}^{-1}$ or more (claim 6).

Regarding **claim 31**, Saupe '770 and Greenfield '107 disclose and teach of a light modulation element as shown above, and Greenfield '107 further teaches that the component A which consists of one or more chiral compounds at least one of which has an HTP of $90 \mu\text{m}^{-1}$ or more (claim 6).

14. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Saupe '770 (US 5,368,770) in view of Greenfield '107 (US 6,421,107), as applied to independent **claim 1** above, and further in view of Abileah '784 (US 5,629,784).

Regarding **claim 16**, Saupe '770 and Greenfield '107 disclose and teach of a modulation element and electro-optical display as shown above, but do not specifically disclose or teach that the display is addressed by means of an active matrix. In the same field of endeavor of electro-optical light modulation elements and displays, Abileah '784 teaches of a display addressed by means of an active matrix for the purpose of displaying the desired graphical data and information (col. 1, line 51-col. 2, line 11). Therefore it would have been obvious to one of

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ordinary skill in the art at the time the invention was made for the display of Saupe '770 and Greenfield '107 to be addressed by means of an active matrix since Abileah '784 teaches of a display addressed by means of an active matrix for the purpose of displaying the desired graphical data and information.

15. **Claims 18 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Saupe '770 (US 5,368,770) in view of Greenfield '107 (US 6,421,107), as applied to independent **claim 1** above, and further in view of Nonaka '519 (US 6,171,519).

Regarding **claim 18**, Saupe '770 and Greenfield '107 disclose and teach of a modulation element and electro-optical display as shown above, but do not specifically disclose or teach that the display is a television screen, computer monitor, or both. In the same field of endeavor of electro-optical light modulation elements and displays, Nonaka '519 teaches of a display which is a television screen, for the purpose of enlarging information capacity, providing increased response speed, and providing increased viewing angles (col. 1, lines 12-46). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the display of Saupe '770 and Greenfield '107 to be a television screen, computer monitor, or both since Nonaka '519 teaches of a display which is a television screen, for the purpose of enlarging information capacity, providing increased response speed, and providing increased viewing angles.

Regarding **claim 21**, Saupe '770 and Greenfield '107 disclose and teach of a modulation element and electro-optical display as shown above, but do not specifically disclose or teach of a method for the display of video signals or of digital signals or information, comprising

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transmitting video signals or digital signals to such a display as shown above. In the same field of endeavor of electro-optical light modulation elements and displays, Nonaka '519 teaches of a method for the display of video signals or information, comprising transmitting video signals or to such a display as shown above, for the purpose of utilizing enlarged information capacity, increased response speed, and increased viewing angles (col. 1, lines 12-46). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the display of Saupe '770 and Greenfield '107 to display video signals or digital signals or information, comprising transmitting video signals or digital signals to such a display as shown above, since Nonaka '519 teaches of a method for the display of video signals or information, comprising transmitting video signals or to such a display as shown above, for the purpose of utilizing enlarged information capacity, increased response speed, and increased viewing angles.

Allowable Subject Matter

16. **Claims 6-8, 10, and 13-14** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: none of the prior art either alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 U.S.C. 102 or 103.

Regarding **claim 6**, none of the prior art either alone or in combination disclose or teach of an electro-optical light modulation element as claimed, specifically wherein the relative temperature dependence ($dV^* 10/dT$) of the characteristic voltage for 10% relative

contrast (V10) of the modulation medium is 30%/degree or less at a temperature of 2° above the characteristic temperature (Tchar.) in the range of $\pm 1^\circ$ around this temperature.

Regarding **claim 7**, none of the prior art either alone or in combination disclose or teach of an electro-optical light modulation element as claimed, specifically wherein the relative temperature dependence ($dV \cdot 10/dT$) is 23%/degree or less.

Regarding **claim 8**, none of the prior art either alone or in combination disclose or teach of an electro-optical light modulation element as claimed, specifically wherein the characteristic voltage for 10% relative contrast (V10) at a temperature of 2° above the characteristic temperature (Tchar.) of the modulation medium in cells is 80 V, preferably 60 V or less.

Regarding **claim 10**, none of the prior art either alone or in combination disclose or teach of an electro-optical light modulation element as claimed, specifically wherein all the chiral compounds of component A have the same sign of the HTP at 20 degrees Celsius in the reference mixture.

Regarding **claim 13**, none of the prior art either alone or in combination disclose or teach of an electro-optical light modulation element as claimed, specifically wherein the dielectric susceptibility (ϵ_{av}) of the modulation medium at a temperature of 4 degrees above the conversion temperature from the blue phase or from the cholesteric phase into the isotropic phase is 40 or more, preferably 55 or more.

Regarding **claim 14**, none of the prior art either alone or in combination disclose or teach of an electro-optical light modulation element as claimed, specifically wherein the optical anisotropy at a temperature of 4 degrees below the transition temperature from the cholesteric phase into the isotropic phase is 0.050 or more, preferably 0.080 or more.

Response to Arguments

17. Applicant's arguments with respect to **claims 1-4, 9, 15-18, and 21** have been considered but are moot in view of the new ground(s) of rejection as shown above.

Specifically, applicant's arguments with respect to **claims 1-4, 9, 15, and 17** have been considered but are moot in view of the new ground(s) of rejection over Saupe '770 in view of Greenfield '107 as shown above.

Specifically, applicant's arguments with respect to **claim 16** have been considered but are moot in view of the new ground(s) of rejection over Saupe '770 in view of Greenfield '107 and further in view of Abileah '784 as shown above.

Specifically, applicant's arguments with respect to **claims 18 and 21** have been considered but are moot in view of the new ground(s) of rejection over Saupe '770 in view of Greenfield '107 and further in view of Nonaka '519 as shown above.

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Roberts whose telephone number is (571) 270-1288. The examiner can normally be reached on Monday-Friday 8am-4/5pm with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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